

# A changing landscape

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Sand Point Beach in Prior Lake is still choppy in late November. The ice hasn't set in yet this year.

## CLIMATE CHANGE SCULPTS A NEW FUTURE FOR MINNESOTA

**A**round this time every year in Prior Lake, lake-side residents are deputized as lookouts. Their job: to keep an eye on the surface of the lake. "We do use volunteers for this program," Jamie Rockney of the Prior Lake-Spring Lake Watershed District said. "We email people who live on the lakes to let us know when it freezes over."

As a result, the Prior Lake-Spring Lake Watershed District has an extensive database of "ice in" and "ice out" times over the years.

But this annual tradition is gradually going to change as Minnesota feels the effects of climate change. Sam Potter, who has cred both as a Minnesota native and someone with a doctorate in atmospheric and oceanic sciences from Princeton University, can tell you just how much it has changed already. "This is a lot of what global warming is. It's moving toward a new state," he said during a Nov. 9 presentation.

Potter said over the last 30 years, the average Minnesota temperature has warmed nearly 2 degrees. That may not seem like much, and in reality, climate change's effect on Minnesota life isn't as cut and dried as the word "warming" would imply. For instance, from 1951 to 1980, in a given month, temperatures could fluctuate from 13 degrees below average to 15 above. For the last 30 years, that trend has shifted. The range is now from 12 below to more than 21 above.

"This is the big fingerprint of global warming: extremes," he said.

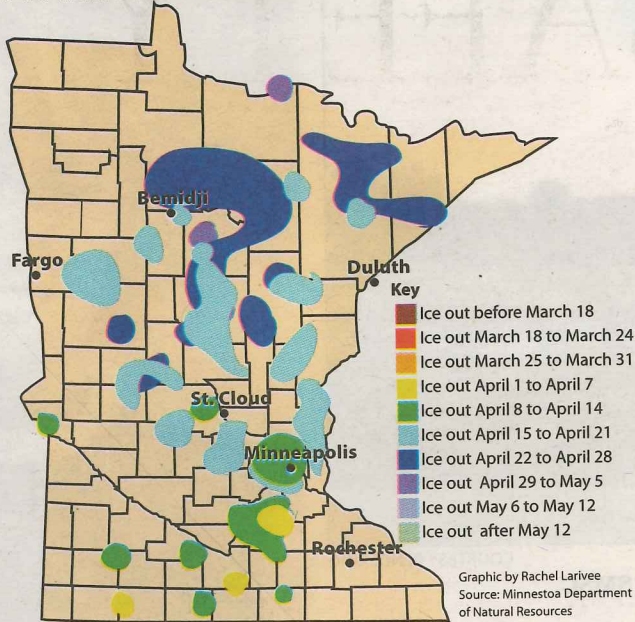
That means a number of things. It means there will be more "tropical" nights when the temperature doesn't drop below 68 degrees. It means growing seasons will be longer, but peppered with more extreme weather events. It means winters will be milder. Summers will be hotter. More rain, less snow.

If those changes seem minute, know that this shift in climate

**Climate to 4 >**



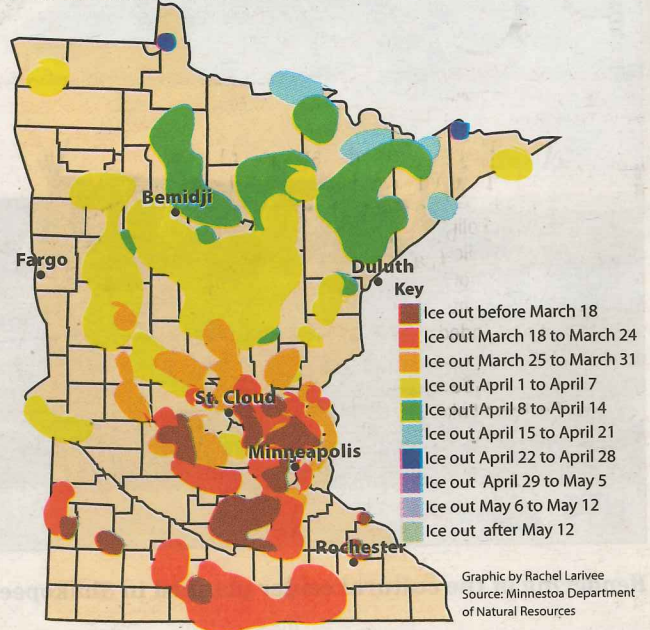
## 1980 Lake Ice Out Dates



MINNESOTA DEPARTMENT OF NATURAL RESOURCES

This is a map based on the Minnesota Department of Natural Resources' ice out data from 1980.

## 2017 Lake Ice Out Dates



MINNESOTA DEPARTMENT OF NATURAL RESOURCES

This map based on the Minnesota Department of Natural Resources' ice out data from 2017.

## CLIMATE

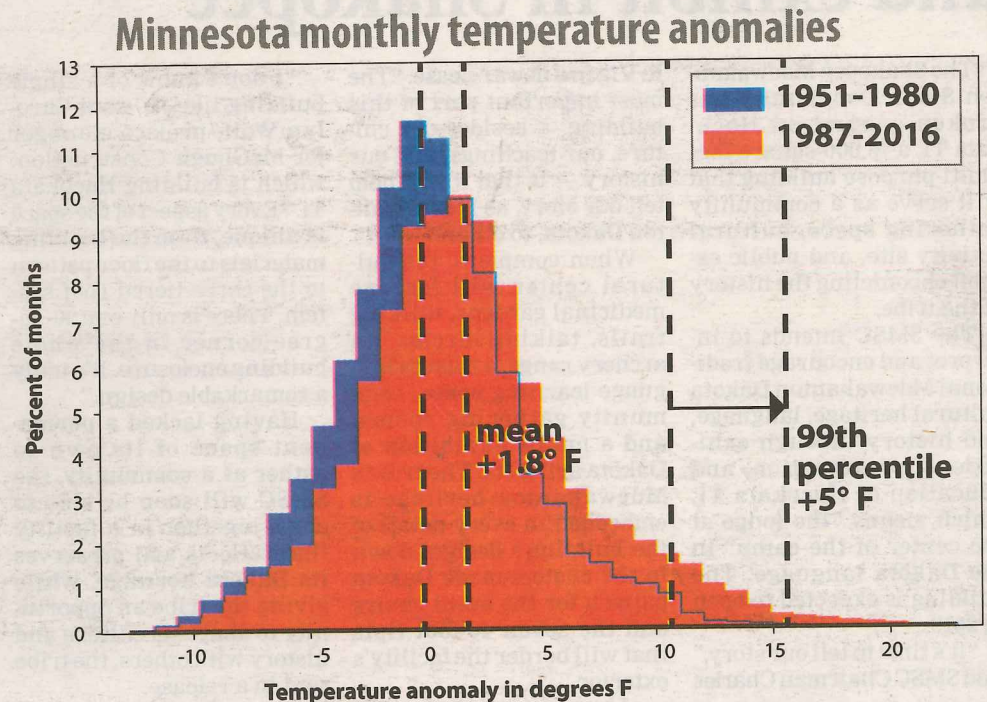
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would mean a ripple effect into countless other parts of Minnesota life. The famously harsh "Minnesota Winter" will no longer have as much snow or ice, which means both humans and animals will pass the cold months differently. It means changes for the way Minnesota farmers produce their crops. It means changes in which plants and animals can survive in Minnesota at all. It would mean Minnesota life as we know it would be completely different.

"A future Minnesota would probably not be recognizable to Minnesotans now," Potter said.

## ICE TIME

Minnesota's future climate is looking milder, wetter and overall, less icy. Prior Lake isn't the only place where people keep track of ice in and out dates. The Minnesota Department of Natural Resources has a comprehensive map of when local lakes freeze over and thaw, with some of the data points going back to the 1800s. Over the past 30 years or so, lakes have been icing out sooner



BY SAM POTTER

**Histogram of monthly average temperatures in Minnesota and their monthly change from the historical 1951-1980 monthly average. The blue bars show the historic baseline, and red shows 1987-2016 monthly averages.**

gradually toward losing their ice before March 18.

That can mean a number of things for local lakes. For one: more vegetation.

"Depending on the ice thickness, you can have vegetation growing under the surface," said Kathryn

Lake-Spring Lake Watershed District. Last year, Prior Lake had late ice ins and early ice outs, which led to more rampant vegetation growth. More vegetation can actually be good for water quality, but not necessarily for quality of life, she said.

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And besides that, other things tend to survive less icy winters, too — like diseases and invasive species.

Not least significant: ice is part of Minnesota winters. It's a must for ice fishing, skating, hockey and other



# CLIMATE

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state-beloved traditions. Shorter times between ice in and ice out means less time for the ice to get thick enough for recreation. For now, Minnesotans are keeping an eye on the water to see what kind of a season they'll get this year.

"The ice is just starting to form in the smaller ponds," Rockney said. Time will tell if the initial layer will stick around, and for how long, this year.

## THE BIRDS AND THE BEES

Animals of all kinds have adapted to a certain standard of living. The punishing white winters many onlookers think are unbearable might be described by a snowshoe hare as "necessary." That is, if a snowshoe hare could talk. Bryan Lueth, wildlife habitat program manager for the Minnesota Department of Natural Resources, however, can.

"Some of the critters here might be adversely affected," he said. "The snowshoe rabbit sheds its brown coat and gets a white coat in the winter."

That helps it blend in with the snowy background and keep from getting eaten until spring, when it swaps colors again to blend in with the bare ground. Regardless of whether the snow comes — and how much — the snowshoe hare is going to turn white. In a milder, relatively less snowy Minnesota winter, that can prove to be a fatal problem.

And it's not just about animals who need the cold — it's also about the animals that hate it. Normally, when the snows close in, Minnesota gets a reprieve from parasites and pests. If winters are shorter and milder, there's a chance more of them can

survive the long months, to the detriment of other species.

"The warming climate might favor the tick," Lueth explains. This is bad news for moose. Ticks can make moose weaker, easier prey for natural enemies, such as wolves. It also might be bad news for trees. Cold temperatures can stop scourges like the emerald ash borer in their tracks. Without that winter buffer, they could become even more of a problem for Minnesota's ash trees.

Some local animals — like the wild turkey — might flourish in a warmer Minnesota, which may expand their range into the colder northern territory, Lueth said. But the species of plants and animals that can only survive up north, like the balsam fir, may soon find themselves in an unfriendly habitat.

Right now, the Minnesota Department of Natural Resources is trying to take climate change into account when planning projects. When they replace trees, they try to pick species that will survive better in a warm winter and survive more pest attacks.

"We're already taking a look at things right now and making some educated guesses," he said.

## FARMING

If there's one occupation that depends on the whims of the weather, it's farming. According to Potter, Minnesota's future is going to include a longer growing season, but not necessarily a better one. The summers will be hotter, and there will be more rain — but mostly all at once.

Dori Klein, field staff representative for the Minnesota Farmers Union, got a taste of that in 2010, when nearly all of her crops were wiped out by a flood in Zumbro Falls.

"They always talk about the 100-year flood," she said. "We're seeing the flooding and the heavy rains more frequently."

They sorted themselves out somewhat, but that doesn't leave Klein with a clear plan for the future. What will she do for the next "100-year flood" in the span of 100 years?

"I guess we're not sure what we could do," she said. "It's going to happen."

Watershed district officials south of the river have been thinking about the next big flooding event since a 2014 downpour drenched their counties. Carver County Water Management Organization manager Paul Moline said in a previous story, "Pretty much every year, somewhere in the state has a 500-year event."

Prior Lake-Spring Lake Watershed District officials are trying to combat this by getting more farmers to incorporate cover crops into their farming. Cover crops prevent soil from eroding by using crops as placeholders between harvests, securing the soil with the crops' root systems.

"The idea is you want more continuous cover on your field," Keller-Miller said. That way, when the rains come, they can't sweep away as much soil.

Potter said at this point it's too late to prevent climate change. It's here.

"If we wanted to have the debate, we should have had it 40 years ago," he said.

If more is to be done about the eventual trajectory of climate change, Potter said, humans are going to have to start changing the way they live. It's up to Minnesotans to decide what they want their state to look like another 30 years from now.